

GEORGIA INSTITUTE OF TECHNOLOGY  
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

Closeout Notice Date 06/07/90

Project No. E-25-611

Center No. 10/24-6-R6797-OA0

Project Director UMEAGUKWU I C

School/Lab ME

Sponsor SME MFG ENGR EDUCATION FDN/DEARBORN, MI

Contract/Grant No. 589-1354 Contract Entity GTRC

Prime Contract No.

Title RESEARCH INITIATION FOR SEAM TRACKING OF WELD JOINTS USING ULTRASONIC SEN

Effective Completion Date 900615 (Performance) 900615 (Reports)

Closeout Actions Required:	Y/N	Date Submitted
Final Invoice or Copy of Final Invoice	Y	900402
Final Report of Inventions and/or Subcontracts	Y	
Government Property Inventory & Related Certificate	N	
Classified Material Certificate	N	
Release and Assignment	N	
Other	N	
Comments		

Subproject Under Main Project No.

Continues Project No.

Distribution Required:

Project Director	Y
Administrative Network Representative	Y
GTRI Accounting/Grants and Contracts	Y
Procurement/Supply Services	Y
Research Property Management	Y
Research Security Services	N
Reports Coordinator (OCA)	Y
GTRC	Y
Project File	Y
Other	N
	N

NOTE: Final Patent Questionnaire sent to PDPI.

16:56:46

OCA PAD INITIATION - PROJECT HEADER INFORMATION

08/22/89

Active

Project #: E-25-611

Cost share #:

Rev #: 0

Center # : 10/24-6-R6797-0A0

Center shr #:

OCA file #:

Contract#: 589-1354

Mod #:

Work type : RES

Prime #:

Document : GRANT

Contract entity: GTRC

Subprojects ? : N

Main project #:

Project unit:

ME

Unit code: 02.010.126

Project director(s):

UMEAGUKWU I C

ME

(404)894-7411

Sponsor/division names: SME MFG ENGR EDUCATION FDN

/ DEARBORN, MI

Sponsor/division codes: 500

/ 124

Award period: 890616 to 900615 (performance) 900615 (reports)

Sponsor amount

New this change

Total to date

Contract value

5,000.00

5,000.00

Funded

5,000.00

5,000.00

Cost sharing amount

0.00

Does subcontracting plan apply ? : N

Title: RESEARCH INITIATION FOR SEAM TRACKING OF WELD JOINTS USING ULTRASONIC SENSORS

PROJECT ADMINISTRATION DATA

OCA contact: Kathleen R. Ehlinger

894-4820

Sponsor technical contact

Sponsor issuing office

(000)000-0000

KEITH BANKWITZ, MANAGER (EXT. 510)

(313)271-1500

MANUF. ENGINEERING EDUCATION FOUND.

ONE SME DRIVE, P.O. BOX 930

DEARBORN, MI 48121

Security class (U,C,S,TS) : U

ONR resident rep. is ACO (Y/N): N

Defense priority rating : N/A

N/A supplemental sheet

Equipment title vests with: Sponsor

GIT

NOT APPLICABLE

Administrative comments -

RESEARCH INITIATION TYPE GRANT



**FINAL REPORT**  
**ON**  
**1989 SME EDUCATION FOUNDATION**  
**GRANT 589-1354**

*Research Initiation*  
*Seam Tracking of Weld Joints*  
*Using Ultrasonic Sensors*

*by*

**Charles Umeagukwu**  
*George W. Woodruff School of Mechanical Engineering*  
*Georgia Institute of Technology*  
*Atlanta, Georgia 30332*

*May 1990*

**FINAL REPORT ON  
1989 SME EDUCATION FOUNDATION  
GRANT 589-1354**

**Research Initiation  
Seam Tracking of Weld Joints  
Using Ultrasonic Sensors**

**by**

**CHARLES UMEAGUKWU**

**George W. Woodruff School of Mechanical Engineering  
Georgia Institute of Technology  
Atlanta, Georgia 30332**

In 1989 Georgia Tech received an SME Grant for research initiation. The grant was for a study of the application of ultrasound to real-time seam tracking of weld joints. The focus was on providing accurate ultrasonic range information that is necessary for tracking in a welding environment. In particular, the study investigated various ways of shielding the ultrasonic sensor from the welding arc. A shielding mechanism called an exponential horn was designed and implemented. The three-dimensional horn provided accurate range information during welding and non-welding conditions.

The SME grant helped us to prepare three proposals that were submitted to the National Science Foundation (NSF), the Marshall Space Center, and the Office of Naval Research (ONR). The proposal to NSF has resulted in three-year funding (worth more than \$250,000) to study real-time weld quality control, using optical fiber phased array technique. A paper resulting from this work has been accepted for publication in Materials Evaluation. For the past two years, we have received both equipment and

research initiation grants from the SME Education Foundation. We are very pleased about what these grants have done for our research program in the area of welding process controls; with these resources, our research has moved from a level of obscurity to a level of national visibility. Thanks to the SME Foundation, we can proudly say that we have a viable welding research program at Georgia Tech.



One SME Drive, P. O. Box 930, Dearborn, MI 48121, (313) 271-1500

**Reginald W. Barrett, CMfgE**  
Retired President  
Pyle National Division  
BRIntec Corporation

**Dr. Martin G. Abegg, PE**  
President  
Bradley University

**Ray Adams**  
Director-Manufacturing Operations  
Caterpillar Inc.

**L. Joe Bauman**  
Director-Quality Development  
and Manufacturing  
IBM Corporation

**Lewis B. Campbell**  
Vice President & Product Manager  
Flint Automotive Division  
General Motors Corporation

**Marcus B. Crotts, PE, CMfgE**  
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Crotts & Saunders Engineering Inc.

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Lockheed-California Company

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Technology  
Northrop Corporation

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Vice President-Development  
Operations  
Pratt & Whitney

**James L. Koontz**  
President & Chief Executive Officer  
Kingsbury Machine Tool Corporation

**Eugene M. Nelson**  
Manager, Manufacturing  
and Plant Engineering  
Ford Motor Company

**Earl E. Walker**  
President  
Carr Lane Manufacturing  
Company

**Dr. Warren W. Worthley, CMfgE, PE**  
Retired Dean  
School of Engineering & Technology  
Indiana University-Purdue University

**Keith Bankwitz, CFRE**  
SME Foundation

May 8, 1990

**W. Denney Freeston**  
Associate Dean  
College of Engineering  
Georgia Institute of Technology  
Georgia Tech Research Corp.  
Atlanta, GA 30332-0406

RE: SME Grant #589-1354

Dear Dean Freeston::

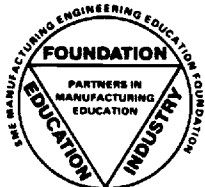
This letter is to remind you that the above grant was awarded nearly one year ago and that your account is still open.

The duration of your Foundation grant is one year from the award letter you received last June unless stated otherwise. If you haven't already begun, you will want to start finalizing the activities involved with this grant and submit the necessary paperwork for reimbursement.

Specifically, a Final Report relating the grant activity and the effects the award monies or gifts have had on your program is mandatory. Your university's invoice requesting reimbursement for one or all areas is also required. A copy of the Final Report Guidelines and Grant Award Payment Procedures is enclosed for your review and use.

If you are experiencing problems in completing your grant, please fill out the attached Open Grant Status Statement explaining the difficulty and estimate when we can expect your request for reimbursement. A no-cost extension for not more than 90 days is available for grants other than multi-year student development.

By June 5, 1990, I need to receive either your reimbursement request documentation or your Open Grant Status Statement. Your account will be considered "PAST DUE" after June 5, 1990.



...an educational foundation of the  
Society of Manufacturing Engineers

W. Denney Freeston  
Georgia Institute of Technology  
589-1354  
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Contact me at (313) 271-1500, Ext. 512 if you have any questions regarding the finalizing of your award. I look forward to either receiving your documentation or hearing from you.

Sincerely,

Dora L. Murray //  
Grants Coordinator

DLM/md  
Enclosures

cc: William M. Sangster

P.S. Final Reports should cover the activities and impact of both the cash and in-kind gifts.





## FINAL REPORT GUIDELINES

A Final Report of grant activities and its impact must be submitted to the Foundation for in-kind gift awards and for each funded cash area of a grant in order to be eligible for reimbursement. The style of the Final Report is to be narrative and should include the following information pertinent to each grant:

1. Grant proposal number
2. Funded area(s) or gift award(s)
3. Name of the awarded institution
4. Name of the Project Director
5. Final Report abstract (one page maximum)
6. Explain the effect the grant or gift had on your course or program:

### Capital Equipment

Explain what the grant has purchased, how it is used in a program, and how it has affected the course.

### In-Kind Gift Award

Explain how the equipment or software is used in a program and how it has affected the course.

### Student Development

After a student has been selected by the institution, a resume of the student should be submitted to the Foundation along with recruitment materials. At the conclusion of the award period, a student progress report regarding the development of the recipient, his grade point average, any contributions to the program by the student, and his intent toward continuing in manufacturing engineering education. State the recipients and award year.

### Faculty Development

List conferences, seminars, etc. which faculty attended relating the information received and how it will be implemented in your course or program. For fellowships/sabbatical support list travel, equipment, supplies or expenses involving incidental costs associated with a fellowship or creative activity of a sabbatical.

### Curriculum Development

List materials purchased, their purpose and use to the university library or course, and their effect on your program.

### Research Initiation

Explain the proposed project, who the proposals were submitted to and relate the results of your efforts.

7. Project developed materials as attachments.

Dora Murray, Grants Coordinator  
SME Manufacturing Engineering  
Education Foundation  
One SME Drive, P.O. Box 930,  
Dearborn, MI 48121  
(313) 271-1500, Ext. 512

## GRANT AWARD PAYMENT PROCEDURES

The following payment procedures are established to assist SME Foundation grant recipient institutions in submitting proper feedback and documentation to expedite reimbursement. Contact our office if you have any questions regarding these procedures or your grant.

1. The Foundation issues only one check per funded area, except in Research and Faculty Development grants (sabbatical leave) when one-half the funded amount may be paid at the start of the project and one-half at the completion. Multi-year Student Development grants receive one check per year for the duration of the scholarship.
2. Essential elements for each reimbursement request are:
  - 2.1 A Final Report of grant activities for each funded area. Please refer to the attached Final Report Guidelines for grant reporting format and special instructions for in-kind sponsored gifts and student development awards.
    - 2.1.1 Student Development grants which are multi-year awards must have a transcript submitted for each recipient per year and a progress report for each recipient at the completion of each award period.
  - 2.2 An invoice in triplicate to the Foundation for reimbursement of expenses incurred in the funded area. Checks will be made payable to the institution and will be mailed to the Project Director or Contract & Grants Accounting as directed on the invoice.
    - 2.2.1 Where matching funds are indicated in support of the original funding request, institution and industry dollar support must be summarized with the invoiced expenses.

Please note: Grants are awarded to colleges and universities under the direction of a Project Director. In the absence of the original Project Director, a new one must be designated by the institution and a vitae sheet submitted to the Foundation before final payment can be made.

## FUNDED AREA SPECIFIC REQUIREMENTS

### CAPITAL EQUIPMENT

Payment for equipment purchased will be based on paid receipts and the university reimbursement invoice which must indicate the total amount expensed, the portion funded by industry and/or institution matching funds, and the amount requested for reimbursement from the Foundation.

## STUDENT DEVELOPMENT

### A. Scholarships and Fellowships

In requesting first payment for scholarships and fellowships, a brief summary (one page) of student recruitment activities must be included as well as copies of recruitment materials (posters, brochures, etc.).

A transcript of the student's high school and/or college activities and grades must be submitted for each recipient. Responsibility for monitoring student progress and continuance in the manufacturing program rests with the institution. At the end of the scholarship/fellowship funded period, a student progress report must be submitted by the Project Director to the Foundation regarding the development and possible contributions to the program.

The institution will make the award to the student in the name of the SME Manufacturing Engineering Education Foundation.

It is not the intent of the SME scholarship to replace other federal or state financial aid being received by the recipient. Applicants for the award should be screened by the institution's financial aid office to determine the amount of the scholarship they can receive from the SME Foundation. Should significant federal or state replacement money be involved, a new scholarship recipient should be selected.

### B. Other Student Development Awards

Awards for workshops or other special student development activities will be paid directly to the institution upon receipt of a Final Report and a university invoice for Foundation reimbursement. Prepayment can be arranged for special cases after discussion and approval with the Foundation Grants Coordinator.

## FACULTY DEVELOPMENT

### A. Faculty Travel and Continuing Education Grants

Awards for faculty travel and faculty continuing education grants will be paid directly to the institution upon receipt of a Final Report identifying the conference/seminar attended and a university invoice for Foundation reimbursement.

### B. Fellowships and Sabbatical Support

Reimbursement will be paid directly to the institution for full-time graduate school activity or travel, equipment, supplies and expenses or incidental costs associated with creative activity of a sabbatical. One-half of the grant may be paid at the start of the award period, and one-half will be reimbursed at the completion of the project upon receipt of a university invoice for Foundation reimbursement and a Final Report of the activities.

## CURRICULUM DEVELOPMENT

### A. Curriculum Development

Reimbursement will be paid to the institution for expenses involving course development, faculty release time, student assistance, teaching materials, investigative travel, guest speakers, library awards, and other educational resource materials upon receipt of a university invoice for Foundation reimbursement and a Final Report.

### B. Consultation Expenses

Payment will be made to the institution for an SME approved consultant to meet with faculty and administration to assist curriculum development for future accreditation upon receipt of a university invoice for Foundation reimbursement and a Final Report.

## RESEARCH INITIATION

Research initiation grants will provide seed money for the development and definition of major generic research projects in manufacturing. Payments will be made in one of the following ways:

- A. Upon receipt of a university invoice for Foundation reimbursement, one-half of the grant amount will be paid to the institution at the start of the activity. Upon receipt of a second university invoice and a Final Report, the remaining one-half of the grant amount will be paid to the institution; or
- B. Upon receipt of a university invoice for Foundation reimbursement for the full amount of the grant and a Final Report regarding the activities of the completed project, one single payment will be made to the institution.

Contact our office if you have any questions regarding these payment procedures or the information required for reimbursement:

Dora Murray, Grants Coordinator  
SME Manufacturing Engineering  
Education Foundation  
One SME Drive, P. O. Box 930  
Dearborn, MI 48121

(313) 271-500, Extension 512

Congratulations again and good luck with your grant activities.